

Description

[Cost-effective Energy Conservation System]

BACKGROUND OF INVENTION

- [0001] Energy costs to cool structures (e.g. houses, offices, condominiums) in order to maintain an optimal temperature inside when it is hot outside can be significant. The seasonal, peak demand imposed upon the electrical grid by the air conditioners during the hot summer daytime months necessitate bigger power generating stations than would otherwise be necessary. This results in pollution and degradation of environment when conventional fuels such as coal, natural gas, oil or nuclear are used.
- [0002] The field of the present invention relates to reducing cooling energy bills for structures such as houses, condominiums, and offices etc. thereby conserving energy.
- [0003] Earlier inventions such as the attic fans and the whole house fans worked by automatically operating when the heated attic air reached a certain set temperature. The

operation of such fans threw out the super heated attic air that was then replaced by the comparatively cooler outside air. At this point, the fan stopped running. With the attic no longer as hot, it took the air conditioner less time and therefore correspondingly less energy to cool the house. The sum total of the energy required to run the attic or whole-house fan and the air conditioner was thus less than would otherwise be the case to reach a given lower temperature within the house. These inventions suffer from the following drawbacks a) the roof shingles and the corresponding underlying structure still goes through large temperature swings thereby reducing its life. b) the action (i.e. the fans becoming operational) is taken in response to the cause (i.e. super heated attic air) while no attempt is made to mitigate the cause. c) some energy is used for the operation of the fan.

[0004] Roof top vegetation aims to conserve energy by now allowing the roof to get hot with the incident solar energy and also reduces the pollution. Its principal drawback is the requirement that the roof be flat. It is therefore more suited for high-rises in the cities.

SUMMARY OF INVENTION

[0005] Roof shingles are typically dark and rough and easily ab-

sorb solar heat. Especially in areas that experience summer temperatures in excess of 80 degree Fahrenheit significant energy savings can be obtained by preventing the roof from absorbing the incident solar energy during the hot summer months. It is therefore the principle objective of the present invention to provide an mechanism to prevent heat buildup in the attic.

[0006] A cloth like synthetic material is stretched over the roof during the summer months to shield it from the sun. The smooth, light-colored, reflective surface of this material shall reflect most of the solar energy back and prevent it from reaching the roof. The air gap between the reflective material and the roof will further insulate the roof from the solar heat. Since the covered roof will now remain much cooler than it would otherwise, it will prevent the attic air from heating up to the same extent, as it would have without the benefit of this invention. The temperature buildup within the attic will also have a lower gradient. Both of these factors combine to allow the household air conditioner to run for shorter durations in order to achieve a given lower temperature. This results in lower cooling energy bills and conservation of energy.

[0007] Another incidental benefit of the present invention is that

it shields the roof from rain if the synthetic material is waterproof. This may mitigate water damage to the house if the roof has leaks in it.

BRIEF DESCRIPTION OF DRAWINGS

[0008] Figure 1 is an isometric view of the system during the summer months when the roof is totally covered by the reflective surface.

[0009] Figure 2 is a plan view of the system during the summer months.

[0010] Figure 3 is an isometric view of the system during the winter months when the reflective surface is totally retracted.

[0011] Figure 4 is a plan view of the system during the winter months.

DETAILED DESCRIPTION

[0012] Figures 1 and 2 illustrate the end result after the present system has successfully operated and completely covered the roof. Figures 3 and 4 illustrate when the roof is completely uncovered. The numbering system used to identify entities is consistent across all the figures.

[0013] As shown in figures 1 and 2, rollers 1a and 1b shaped like dumbbells and running along the complete length of a

section of the roof 6, are first mechanically mounted at two endpoints on the corresponding roof section. Such roller pairs can be mounted on as many roof sections as is deemed necessary by the user. The reflective cloth-like material 2 (in figure 1 and 2) is wound around roller 1b. This cloth-like covering material has eyelets 8 at one end along its edge to which strings 9 are attached as shown in figure 2. The strings get wound around roller 1a. Both the rollers 1a and 1b are operated by small motors 5b and 5a respectively. These motors can either be manually operated or connected to a thermostat and controlled automatically. The motors 5a and 5b may use a standard belt mechanism 4a and 4b as shown in figure 1 to drive the rollers 1a and 1b. The belt mechanism is for illustrative purposes only and any other suitable transmission mechanism may be utilized to turn the rollers. A limit-switch mechanism may be utilized to stop the motors automatically when the roof cover is either completely retracted or vice versa and is not shown in the figures. Friction pads against the rollers 1a and 1b (not shown in the figures) may also be mounted so that when the rollers turn the roof cover is held taut.

[0014] At the start of the summer, motor 5b is activated. The belt

drive 4b turns the roller 1a to pull the reflective roof cover from roller 1b. The motor may either be manually stopped at any point to control the amount of roof (area) covered or it automatically stops when the entire roof section is covered due to the operation of a limit switch. Since the roof covering is smooth, light-colored and shiny it reflects most of the incident solar energy and prevents the roof from absorbing the solar energy. The air gap 3 (shown in figure 1) also acts as an insulator. This keeps the attic 7 (shown in figure 1) cooler than would otherwise be the case.

[0015] During the colder months, motor 5a is activated. The belt drive 4a turns the roller 1b to wind the reflective roof cover. The motor may either be manually stopped at any point to control the amount of roof (area) covered or it automatically stops when the entire roof section is exposed due to the operation of a limit switch. Since the roof is now exposed, it can absorb all the incident solar energy.